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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,383	04/12/2004	Helmut Greim	P04,0114	2856

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EXAMINER	
FETZNER, TIFFANY A	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/822,383	GREIM, HELMUT	
	Examiner	Art Unit	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/12/2004 & 8/19/2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to because

A) In figure 4, the component "18" on the right hand side of the page is cutoff halfway between the "8" of the component number "18" so that the reference number appears to be a curved "capital e". Please correct the component number.

B) Component letter "**a**" shown in **figures 3** and **4** is not taught in applicant's specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

A) Component letter "**a**" shown in **figures 3** and **4** is not taught in applicant's specification. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1-16** are rejected under **35 U.S.C. 102(b)** as being anticipated by **Misic** US patent 6,040,697 issued March 21st 2000.

6. With respect to **Claim 1**, **Misic** teaches and shows "An antenna element" (i.e. component 60) "for magnetic resonance applications" [See figures 4, 5; the abstract and col. 2 line 33 through col. 7 line 43.] "comprising: a sub-section" (i.e. component 74) "extending along a section axis;" (i.e., the z-axis) "an auxiliary circuit disposed adjacent to said sub-section, said auxiliary circuit comprising a coupling section and an auxiliary circuit section;" [See auxiliary transmit coil section 72 col. 4 line 55 through col. 5 line 22], "said auxiliary circuit" (i.e. the auxiliary circuitry of coil section 72) "being inductively coupled" [See figures 4, 5, 6, 7; col. 6 line 66 col. 7 line 10, especially col. 7 lines 6-8) "to said sub-section by said coupling section" [See Figures 4-8; col. 5 lines 7-21, col. 6 line 66 col. 7 line 10, especially, col. 5 lines 18-21 and col. 7 lines 6-8] "and said auxiliary circuit section" (i.e. component 72) "proceeding parallel to said sub-section" (i.e. component 74) "at a spacing from said section axis;" [See figures 4 and 5.] "and said auxiliary circuit comprising controllable tuning elements each having a control state" [See the bias of PIN diodes 88; col. 5 lines 3-21; col. 6 line 36 –65], "the respective control states being selectively controllable for, dependent on the respective control states, causing a radio frequency excitation current flowing in said sub-section to produce an auxiliary current in said auxiliary current section leading said excitation current, or an auxiliary current in said auxiliary current section lagging said excitation current, or no auxiliary current in said auxiliary current section." [See figures 4, 5; the abstract and col. 2 line 33 through col. 7 line 43.]

7. With respect to **Claim 8**, which is another corresponding equivalent version of **claim 1**, **Misic** teaches and shows "An antenna element" (i.e. component 60) "for magnetic resonance applications" [See figures 4, 5; the abstract and col. 2 line 33

through col. 7 line 43.] "comprising: a plurality of antenna elements disposed parallel to each other;" [See figures 1, 2, and 4 through 8] **Misic** also teaches and shows the remaining limitations of this claim, (i.e. that "each of said antenna elements comprising a sub-section extending along a section axis, a auxiliary circuit disposed adjacent to said sub-section, said auxiliary circuit comprising a coupling section and an auxiliary circuit section, said auxiliary circuit being inductively coupled to said sub-section by said coupling section, and said auxiliary circuit section proceeding parallel to said sub-section at a spacing from said section axis, and said auxiliary circuit comprising controllable tuning elements each having a control state, the respective control states being selectively controllable for, dependent on the respective control states, causing a radio frequency excitation current flowing in said sub-section to produce an auxiliary current in said auxiliary current section leading said excitation current, or an auxiliary current in said auxiliary current section lagging said excitation current, or no auxiliary current in said auxiliary current section" for the same reasons that were already set forth in the **rejection of claim 1**. [See the rejection of claim 1 above] The same reasons for rejection, that apply to **claim 1** also apply to **claim 8** and need not be reiterated.

8. With respect to **Claim 2**, and corresponding **claim 9**, **Misic** teaches and shows "said coupling section is a component of said sub-section." [See figures 4 and 5] The same reasons for rejection, that apply to **claims 1, 8** also apply to **claims 2, 9** and need not be reiterated.

9. With respect to **Claim 3**, and corresponding **claim 10**, **Misic** shows "said coupling section is a separate element from said sub-section." [See figures 6 and 7] The same reasons for rejection, that apply to **claims 1, 8** also apply to **claims 3, 10** and need not be reiterated.

10. With respect to **Claim 4**, and corresponding **claim 11**, **Misic** teaches and shows "said sub-section is a first sub-section, said auxiliary circuit is a first auxiliary circuit, said coupling section is a first coupling section, said auxiliary circuit section is a first auxiliary circuit section, and said controllable tuning elements are first controllable tuning elements", because **Misic** also teaches and shows "wherein said antenna element further comprises: a second sub-section axially offset from said first sub-section;" [See

inner coil arrangement section 64 of figures 4, and 5; the abstract and col. 2 line 33 through col. 7 line 43.] "a second auxiliary circuit adjacent to said second sub-section;" [See figures 4 and 5 as rods 66 may have adjustable tuning capacitors, or variable capacitors. See also col. 6 line 36 through col. 7 line 43.] "said second auxiliary circuit comprising a second coupling section and a second auxiliary circuit section; said second auxiliary circuit being inductively coupled to said second sub-section by said second coupling section, and said second auxiliary circuit section proceeding parallel to said second sub-section at a spacing from said section axis; and said second auxiliary circuit comprising second controllable tuning elements having respective control states, the respective control states of said second controllable tuning elements being selectively controllable for, dependent on the respective control states of the second controllable tuning elements, causing a radio frequency excitation current flowing in the second sub-section to produce an auxiliary current in the second auxiliary circuit section leading said excitation current in the second sub-section, or an auxiliary current in the second auxiliary current section lagging the excitation current in the second sub-section, or no auxiliary current in the second auxiliary current section." [See figures 4 through 8, the abstract and col. 1 line 4 through col. 7 line 43, where all the connections are set forth in detail. Inner coil section 64 is similar in construction to outer coil 68 and is inside the outer coil during operation of the MRI device.] The same reasons for rejection, that apply to **claims 1, 8** also apply to **claim 4, 11** and need not be reiterated.

11. With respect to **Claim 5**, and corresponding **claim 12**, **Misic** teaches and shows "said first and second auxiliary circuits are inductively decoupled from each other." [See figures 4-8; and col. 4 line 36 through col. 7 line 43.] The same reasons for rejection, that apply to **claims 1, 4, 8, 11** also apply to **claims 5, 12** and need not be reiterated.

12. With respect to **Claim 6**, and corresponding **claim 13**, **Misic** teaches and shows "said first and second auxiliary circuits have an overlapping region." [See figures 4-8; and col. 4 line 36 through col. 7 line 43. The examiner notes that in operation since the inner coil, is inside the outer coil, there is an intrinsic overlapping region. See also col. 3 lines 32-49.] The same reasons for rejection, that apply to **claims 1, 4, 5, 8, 11, 12** also apply to **claims 6, 13** and need not be reiterated.

13. With respect to **Claim 7**, and corresponding **claim 14**, **Misic** teaches and shows "wherein said second controllable tuning elements are selectively controllable independently of said first controllable tuning elements, because each of the conductive rods 66, 82, and 84 of coil array 60 may have its own individual adjustable tuning capacitor," [See col. 5 line 3 through col. 7 line 43; especially col. 5 lines 3-4 and col. 6 lines 36-47.] The same reasons for rejection, that apply to **claims 1, 4, 8, 11** also apply to **claims 7, 14** and need not be reiterated.

14. With respect to **Claim 15**, **Misic** teaches and shows "each of said antenna elements is rod-shaped, and wherein said antenna elements are disposed around an arrangement axis." [See figures 1, 2, and 4 through 8; col. 3 line 12 through col. 7 line 43; especially col. 4 line 55 through col. line 47.] The same reasons for rejection, that apply to **claims 1, 8** also apply to **claim 15** and need not be reiterated.

15. With respect to **Claim 16**, **Misic** teaches and shows that "each of said antenna elements has opposite ends", [See figures 1, 2, and 4 through 8; col. 3 line 12 through col. 7 line 43]; "and wherein said antenna arrangement further comprises two" rings (i.e. 'ferrules" (i.e. the external loops added to the arrangement, or rings 70a, 70b, 80a, 80b, or 80c) "respectively disposed at the opposite ends of the antenna elements coupling said antenna elements with each other." [See figures 1, 2, and 4 through 8; col. 3 line 12 through col. 7 line 43]. The same reasons for rejection, that apply to **claims 1, 8, 15** also apply to **claim 16** and need not be reiterated.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18. **Claim 17** is rejected under **35 U.S.C. 103(a)** as being unpatentable over **Misic** US patent 6,040,697 issued March 21st 2000; as applied to **claims 1, 8, and 15** above, and further in view of **Srinivasan** US patent 6,850,064 B1 issued Feb. 1st 2005, filed November 22, 2000 with an effective US priority date of November 24th 1999.

19. With respect to **Claim 17**, **Misic** teaches and shows that "each of said antenna elements has opposite ends", [See figures 1, 2, and 4 through 8; col. 3 line 12 through col. 7 line 43]; **Misic** lacks directly teaching or showing that "said antenna arrangement comprises a radio-frequency shield surrounding said antenna elements, and a plurality of capacitors coupling the respective antenna elements to said radio-frequency shield at said opposite ends." However, **Srinivasan** shows in figure 9 an RF shield surrounding an RF coil antenna configuration, which like **Misic** is comprised of parallel component sections and auxiliary circuitry. [See **Srinivasan figures 9-15.** The examiner notes that figures 1a, 2a, 3a and 4a of **Srinivasan**, which show the basic premise of the 1997 filed **Misic** invention, are identified as PRIOR ART by **Srinivasan**, and that Figure 3a is taught by **Srinivasan**, as being the work of **Misic** in col. 3 line 64 through col. 4 line 5. Additionally figure 12 of **Srinivasan** shows the cavity, TEM, birdcage resonator of the **Srinivasan** invention is connected to an RF shield through capacitors c1at opposite ends. See Figures 9 and 12 in combination with figures 1a through 8b, 10, 11 and figures 12-15. See additionally the disclosure]

20. It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Srinivasan** with the teaching of **Misic** because the **Srinivasan** invention teaches that the RF coil configuration set forth, is drawn from the earlier works of inventors that include **Misic** as noted in the text of the **Srinivasan** reference with respect to the **Misic** coil configuration of figure 3a, and figure 4a of the prior art. Additionally the use of an RF shield around an RF antenna is commonly utilized for the purpose of reducing noise and increasing the signal to noise

ratio of the detected signals, by preventing other sources of noise from being picked up by the antenna configuration. The same reasons for rejection, that apply to **claims 1, 8, 15** also apply to **claim 17** and need not be reiterated.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(571) 273-8300**.

23. Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TAF
June 10, 2006

Diego Gutierrez
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